the contact structures and ferromagnetic element contacts may be employed to help guide the connector halves along a path where other alignment features **103** may engage. Arrows are used to schematically indicate the primary direction of possible movement of elements to tolerate connector electrical interface mechanical mismatch.

FIG. **50** illustrates a flexible circuit **114** that is not planar, but intentionally formed. In this case, the support for the wiring and contact pads may be applied to a substrate such as Mylar or other thermoplastic that is formed prior to or after circuitization. Magnetic materials **105** may be positioned within formed structures of the substrate behind the formed electrical contact pads **106**. The cross-sectional structure illustrated allows flexing in at least one direction. In general, the contacts can be movable in multiple directions by controlling the shape of the formed member and/or by cutting or removing substrate material to increase flexibility as desired through known stress release design techniques. The shape of the electrical contact points may also be formed to increase Hertzian stress. Structures of this form may be employed, for example, to orient and contain small magnetic elements in variations of the embodiments above.

FIG. **51** includes an extended magnet **107** behind ferromagnetic structures **108** that act as pole extensions and that are fixed in position along the electrical interface of this half of the connector system. The mating connector half illustrated includes discrete ferromagnetic contact structures **109** mounted on compliant circuitry **110**. Variations of this embodiment may also remove the ferromagnetic components from one of the connector halves such that a ferromagnetic component directly connects to FPC contact pads. As was the case above in FIG. **49**, the ferromagnetic structures on both sides participate in electrical conduction.

Although connector structures with linear arrays are primarily used herein for illustration, an unlimited variety of connector contact configurations are possible, including but not limited to linear arrays, x-y area arrays, "bulls eye" rotatable contacts, and non-planar connectors. Many other variations of individual elements of the above embodiments or different combinations of these elements are possible and are considered to be included in the disclosure and enablement of practicing the inventive concepts.

What is claimed is:

1. An electrical connector system comprising:

a first connector comprising:

a first connector mating interface;

a plurality of first electrical contacts disposed along the first connector mating interface; and

one or more first magnetic structures wherein a portion of a first magnetic structure is positioned behind each of the first electrical contacts;

a second connector comprising:

a second connector housing having a second connector mating interface;

a plurality of second electrical contacts disposed along the second connector mating interface; and

a compliant substrate; and

a plurality of second magnetic structures affixed to the compliant substrate wherein a portion of a second magnetic structure is positioned behind each of the second electrical contacts; and

a source of magnetic flux providing a magnetic attraction between the one or more first magnetic structures and the second magnetic structures; and

wherein the magnetic attraction moves the second magnetic structures relative to the second connector housing as the first connector mating interface approaches the second connector mating interface.

2. The electrical connector system of claim **1** wherein the second magnetic structures are affixed within cavities of the second connector housing.

3. The electrical connector system of claim **1** wherein the compliant substrate is located between the second electrical contacts and the second magnetic structures.

4. The electrical connector system of claim **3** wherein the second electrical contacts comprise rigid electrical contact structures affixed to the front side of the compliant substrate.

5. The electrical connector system of claim **4** wherein the rigid electrical contact structures comprise magnetic material.

6. The electrical connector system of claim **1** wherein the second electrical contacts comprise conducting surfaces of the second magnetic structures.

7. The electrical connector system of claim **1** further comprising an aperture in the second connector housing and wherein portions of one or more second magnetic structures extend into the aperture.

8. The electrical connector system of claim **1** wherein at least one first magnetic structure comprises

a magnet having a first pole face and a second pole face; and

a first ferromagnetic element comprising magnetic material that is not a magnet wherein the first ferromagnetic element is positioned proximate to the first pole face of the magnet and wherein the first ferromagnetic element directs magnetic flux through a first electrical contact in a direction substantially perpendicular to the first connector mating interface.

9. The electrical connector system of claim **8** wherein the first connector further comprises:

a plurality of third electrical contacts disposed along the first connector mating interface; and

a second ferromagnetic element comprising magnetic material that is not a magnet and wherein the second ferromagnetic element is positioned proximate to the second pole face of the magnet; and

wherein the second ferromagnetic element directs magnetic flux through a third electrical contact in a direction substantially perpendicular to the first connector mating interface; and

the second connector further comprises:

a plurality of fourth electrical contacts disposed along the second connector mating interface; and

wherein at least one of the second magnetic structures comprises ferromagnetic material that is not a magnet wherein the second magnetic structure provides a magnetic flux path between a second electrical contact and a fourth electrical contact.

10. The electrical connector system of claim **1** wherein the magnetic flux passes in the same direction through adjacent second electrical contacts.

11. The electrical connector system of claim **1** wherein at least one of the first magnetic structures comprises a magnet having a first pole face and a second pole face wherein the first pole face is located closer than the second pole face to the first connector mating interface.

12. The electrical connector system of claim **1** comprising two first magnetic structures and two second magnetic structures wherein

one of the first magnetic structures comprises

a first axially magnetized magnet having its magnetic axis oriented perpendicular to the first connector mating interface;